ELECTRONIC CALIBRATION INC.
7000 Franklin Blvd., #725
Sacramento, CA 95823

RADIO SHACK LIMITED WARRANTY

This equipment is warranteed against defects for 90 days from date of purchase. Within this period, we will repair it without charge for parts and labor. Simply **bring your sales slip** as proof of purchase date to any Radio Shack store. Warranty does not cover transportation costs. Nor does it cover equipment subjected to misuse or accidental damage.

This Warranty gives you specific legal rights and you may also have other rights which vary from state to state.

We Service What We Sell

RADIO SHACK A DIVISION OF TANDY CORPORATION
U.S.A.: FORT WORTH, TEXAS 76102
CANADA: BARRIE, ONTARIO L4M 4W5

TANDY CORPORATION

AUSTRALIA	BELGIUM	U. K
280-316 VICTORIA ROAD RYDALMERE, N.S.W. 2116	PARC INDUSTRIEL DE NANINNE 5140 NANINNE	BILSTON ROAD, WEDNESBURY WEST MIDLANDS WS10 7JN

2A1

Printed in Korea

MICRONTA®

LCD Digital Multimeter

OWNER'S MANUAL

Catalog Number 22-198U

CUSTOM MANUFACTURED FOR RADIO SHACK A DIVISION OF TANDY CORPORAT

The MICRONTA LCD Digital Multimeter is a portable 3½-digit, compact sized Multimeter ideally suited for field, lab, shop, bench and home applications. Here's a review of some of the features that qualify your new Digital Multimeter as a real "pro."

The latest IC and display technology is used to achieve the lowest possible component count. This, in turn, ensures reliability, accuracy, stability and a really rugged, easy-to-handle instrument.

Low battery voltage automatically detected and displayed.

No needles to bend. No parallax and no zero adjust. Just a high contrast, easy-to-read, 3½ digit, liquid crystal display.

Effective overload and transient protection on all ranges.

Over-range indication on each range.

Full auto-polarity operation.

Dual-slope integration to ensure fast, accurate, noise-free measurements.

SPECIFICATIONS

Display:	3-1/2-Digit, LCD
Accuracy	
DC VOLTS 2—20—200—2000V (Maximum measurement = 1000 Volts)	± 0.8% of reading and ± 0.2% of full scale, ± 1 in last digit
AC VOLTS 2—20—200—2000V (Maximum measurement = 500 Volts RMS)	± 1% of reading and ± 0.5% of full scale, ± 1 in last digit
DC-CURRENT 2—20—200mA	± 1.5% of reading and ± 0.2% of full scale, ± 1 in last digit
AC-CURRENT 2—20—200mA	± 1.5% of reading and ± 0.5% of full scale, ± 1 in last digit
RESISTANCE 200Ω—2—20—200—2000KOHM	± 1% of reading and ± 0.2% of full scale, ± 1 in last digit (+6 +4 digit at 200Ω)
20MΩ	± 3.0% of reading and ± 0.2% of full scale, ± 1 in last digit
Operating Temperature:	0°C to 50°C
Storage Temperature:	—20°C to 60°C
Input Impedance:	10 megohms (DC/AC VOLTAGE)
Polarity:	Automatic Polarity
Over Range Indication:	1□□□
Power Source:	9 Volt rectangular battery or AC Adapter (Radio Shack Catalog Number 22-180)
Low Battery Indication:	"BT" on left side of display
Zero Adjust:	Automatic
Weight:	370g
Size:	2" × 8-7/32" × 4-1/8" (49mm × 209mm × 105mm)

CONTROLS AND FUNCTIONS

ITEM NO.	NAME	FUNCTION
1	Display	A 3½ digit display (1999 max) with decimal point and minus polarity indication. Indicates measured input values plus over-range and low battery condition.
2	POWER switch	Turns the instrument ON and OFF.
3	AC adapter jack (DC 9V)	Use only the correct UL-listed AC adapter (Radio Shack Catalog No. 22-180). This is because up to 500 V can appear at the connector. Our adapter is designed to withstand such voltage level (or more).
4	Input (+) Jack	Connect (+) red lead for all voltage, current and resistance measurements.
5	Input (−) Jack	Connect (—) black lead for all measurements.
6	Function switch	For selecting functions: DC Volts, AC Volts, K ohms, DC mA, AC mA
7	Range switch	For selecting ranges: Voltage: 2V, 20V, 200V, 1000V/DC 500V/AC Current: 2mA, 20mA, 200mA Resistance: 200Ω, 2K, 20K, 200K, 2000K, 20MΩ
8	Battery/Fuse Compartment	

EXPLANATION OF SPECIAL PANEL MARKINGS

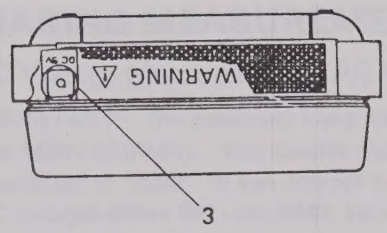
Special marking has been added to the panel to remind you of safety.

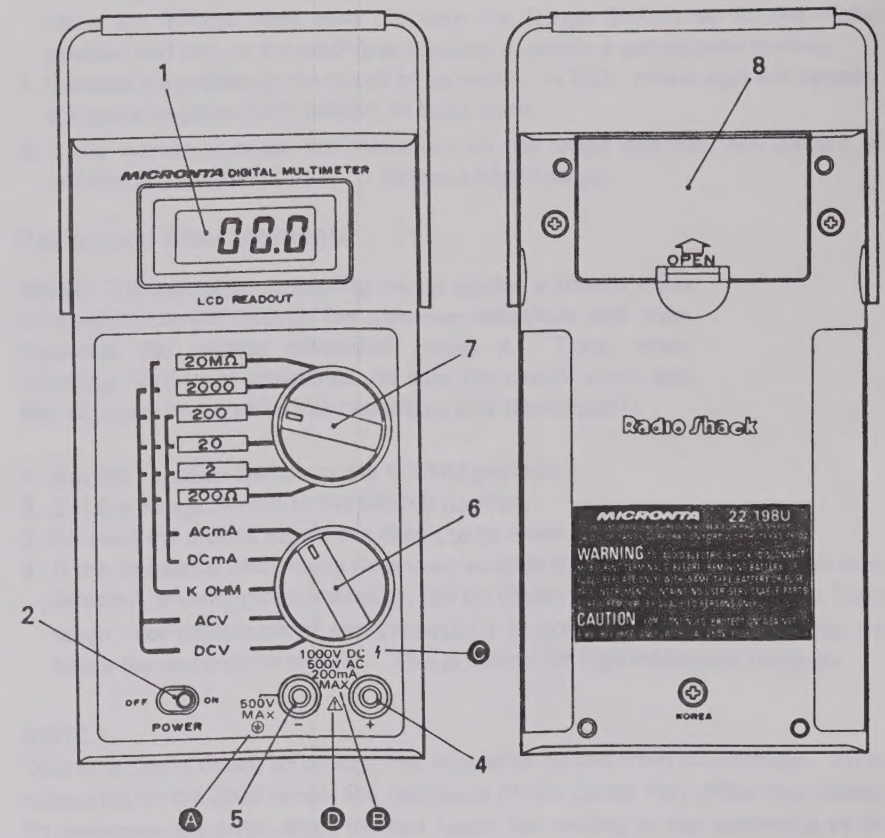
A. 500 V MAX ⏚ To avoid electrical shock and/or instrument damage do not connect the common input terminal (—jack) to any source of more than 500 volts with respect to earth/ground.

B. 1000V DC 500V AC 200mA MAX The maximum voltage or current that can be measured is 1000 V DC, 500 V AC, or 200 mA.

C. ϟ Be extra careful when making measurements for high voltage; do not touch terminals or probe ends.

D. ⚠ Refer to complete operating instructions.





Preparing for Operation

All you need to do is load a 9-volt battery. We recommend that you use the Alkaline type — such as Radio Shack's 23-553.
Be sure **POWER** is OFF and test leads are disconnected.
Open the battery/fuse compartment cover on the rear by pressing in the direction of the arrow. Snap the connector over the terminals of a 9-volt battery. Load the battery into the case and press the battery/fuse compartment cover back on.

When battery becomes weak, "BT" will be displayed on the left side. Replace battery. NEVER LEAVE A WEAK OR DEAD BATTERY IN YOUR UNIT. Even "leak-proof" types can leak and cause damage to the circuitry. When you are not going to use your unit for a few weeks, remove battery.

Or, you can operator from AC power.

WARNING: Use only Radio Shack's 22-180 AC adapter, which can withstand the 500 volts which can appear at the connector.

Zero Adjustment
Is not required. It is automatically done internally in the circuit.
Use only the same type of test leads as are supplied with your unit. These test leads are rated for 1000 volts; Replacements are available from your local Radio Shack store.

Check Before Operation

1. Plug the red test lead into the (+) jack, and the black test lead into the (—) jack.
2. Turn **POWER** ON.
3. Turn the Function Switch to KOHM.
4. With no resistance connected across the test leads, the over-range indication should occur, and display will show "1 ". Short the test leads; the display now should be three zeros.
5. Touch the red probe tip to the black probe tip, and rotate the Range Switch starting at the top (20MΩ). The decimal point in the display should be positioned as follows:

20 MΩ	0.00
2000 K OHM	000
200 K OHM	00.0
20 K OHM	0.00
2 K OHM	.000
200 Ω	00.0

MAKING MEASUREMENTS

DC Voltage Measurements/AC Voltage Measurements

IMPORTANT: The maximum input limit for voltage measurements is 1,000V/DC and 500V/AC(RMS). You cannot measure above these limits even with Range Switch set to "2000". If you attempt to measure DC voltages above 1000 volts or AC voltages above 500 volts RMS, your unit may be damaged.

1. Set Function Switch to DCV or ACV.
2. Set Range Switch as required for the voltage level to be measured. If you don't know the voltage level, start out with the Range Switch set to the highest position and reduce the setting as required to obtain a satisfactory reading.
3. Connect the probes to the circuit to be tested. In DCV, minus sign will appear if voltage is negative (with respect to black lead).
4. If the voltage exceeds the maximum on the range selected, the display will indicate an over-range "1 ". Select a higher range.

Resistance Measurements

NOTE: The resistance measuring circuit applies a known value of constant current through the unknown resistance and then measures the voltage developed across it. Thus, when checking "in-circuit" resistance, be sure the circuit under test has all power removed (are all capacitors fully discharged?).

1. Set the Function Switch to the K OHM position.
2. Set the Range Switch to the desired position.
3. Connect the probes across the circuit to be measured.
4. If the resistance value being measured exceeds the maximum value of the range selected, an over-range indication will be displayed ("1 "). Select a higher range. For resistances of approximately 1 Megohm and above, the Meter may take a few seconds to stabilize. This is normal for high resistance readings.

NOTE 1
Your unit has a circuit to protect the resistance ranges from overvoltage. When measuring on the 200Ω range, the resistance of this circuit may affect the reading. To determine the error, short the test leads: the reading is the resistance of the circuit. Substract this figure from the measured reading. Typically the circuit resistance is between 0.4 and 0.6 ohms.

NOTE 2
Some devices may be damaged by the current applied during resistance measurements. The following table lists the voltage and current available on each range.

RANGE	A	B	C
200	1.21	0.12	0.81
2K	1.21	0.53	0.48
20K	1.21	0.77	0.11
200K	1.21	0.80	0.012
2000K	1.21	0.80	0.0012
20M	1.21	0.80	0.00012

A is open circuit voltage at the jacks in volts.
B is voltage in volts across a resistance equal to full scale value.
C is current in milliamps thru a short circuit at the input jacks.
All values are typical.

NOTE 3
If you accidentally connect the resistance function to a power source greater than 150 Volts the fuse will blow (to protect internal circuitry). This may be easily verified by shorting the test leads. If the fuse is open, the reading will be "1 " and if not, the reading will be "000".

Your Micronta Digital Multimeter has another protection system for the KOHM ranges. For over-voltage lower than 150 Volts, an internal zener diode and resistors will protect the unit from damage.

DIODE CHECK

Since open-circuit voltage between plus and minus input jacks is maintained at 1.21 volts (when in resistance function), you can check continuity of most diodes, transistors, etc. Select the 20 KOHM or 200 KOHM range and connect meter probes to semi-conductor leads. If overrange occurs, reverse lead polarity. If overrange still occurs, the semi-conductor junction is defective (open).

DC Current Measurements

To measure current, you must break the circuit and connect the leads to two circuit connection points. **Never connect the leads across a voltage source;** doing so will blow the fuse or, even worse, may damage the circuit under test.
The maximum input limit for DC current measurement is 200 mA.

1. Place the Function Switch in the DCmA position.
2. Set the Range Switch to the desired position. Always set the Range Switch to the highest position if you don't know the amount of current to be measured.
3. **Remove power from the circuit under test** and then break the circuit at the appropriate point.
4. Connect probes to the circuit.
5. Apply power and read current.

6. If the polarity of the current being measured is negative, the value displayed be preceded by a minus (—) sign.
7. If the magnitude of the current being measured exceeds the selected Range, over-range circuitry will operate, displaying "1 ". When this occu immediately remove power from the circuit under test and select a higl current range.

NOTE
The current ranges are fuse-protected. If inoperative check the fuse.

AC Current Measurements

The maximum input limit for AC current measurement is 200 mA.

1. Set the Function Switch to the ACmA position.
2. Set the Range switch to the desired position. If you are not sure about amount of current in the circuit to be measured, start with the highest curr range and then reduce the Range setting as required to obtain a satisfact reading.
3. Remove the power from the circuit being tested and break the circuit at appropriate point.
4. Connect the probe to the circuit.
5. Reapply power and read current.
6. If the magnitude of the current being measured exceeds the selected Range, over-range circuitry will operate, displaying "1 ". When this occu immediately remove power from the circuit under test and select a higl current range.

Replacement of Battery/Fuse

WARNING TO AVOID ELECTRIC SHOCK, DISCONNECT MEASURING TERMINALS BEFORE REMOVING BATTERY OR FUSE. REPLACE ONLY WITH SAME TYPE BATTERY OR FUSE. THIS INSTRUMENT CONTAINS NO USER SERVICEABLE PARTS. SCREW REMOVAL BY QUALIFIED PERSONS ONLY.
CAUTION FOR CONTINUED PROTECTION AGAINST FIRE, REPLACE ONLY WITH 1A, 250V FUSE.

1. Be sure **POWER** is OFF and test leads are disconnected.
2. Open the Battery/Fuse Compartment Cover.
3. Pull the red ribbon in the fuse compartment. The fuse will pop out.
4. Insert a new fuse on the ribbon ring. Use only a fuse of the same type/ratir (1 A, 250 V, 5ϕ × 20 mm Miniature fuse).
5. Install fuse with ribbon in the fuse compartment.
6. Close the Battery/Fuse Compartment Cover.

WARNING: DO NOT OPERATE THE UNIT UNTIL THE BATTERY COVER IS I PLACE AND FULLY CLOSED.